



DELAWARE STATE-WIDE INFORMATION TECHNOLOGY AND ARCHITECTURE STANDARDS

Standard ID:	IN-DBMS-002
Title:	Database Management Systems Guideline
Revision Number:	0
Domain:	Platform
Discipline:	Data Management
Effective:	01/13/2023
Reviewed:	01/13/2023
Approved By:	Chief Technology Officer
Sponsor:	Chief Technology Officer

I. Authority, Applicability and Purpose

- A. **Authority:** [Title 29](#) Chapter 90C Delaware Code, §9004C – General Powers, duties and functions of DTI “2) Create, implement and enforce statewide and agency technology solutions, policies, standards and guidelines, including as recommended by the Technology Investment Council on an ongoing basis and the CIO”
- B. **Applicability:** Applies to all State of Delaware communications and computing resources. The Department of Technology and Information (DTI) is an Executive Branch Agency and has no authority over the customers in Legislative and Judicial Branches, as well as Local Education Agencies, and other Federal and Local Government entities that use these resources. However, all users, including these entities, must agree to abide by all policies, standards promulgated by DTI as a condition of funding, access and continued use of these resources.
- C. **Purpose:** Currently, the State has multiple database management systems in production with multiple number of versions of these database management systems. This guideline will identify those database management systems and versions that are considered appropriate for the State to concentrate on in the future.

II. Scope

- A. **Areas Covered:** Only general use DBMS are covered by this guideline, not proprietary use databases such as laboratory or instrumentation databases, not Document Management Systems or specific-use applications like Active Directory, Outlook, e-mail, or Calendaring. When available, a general use DBMS is recommended over a proprietary solution.



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- B. **Environments**: This guideline will cover all database management systems (DBMS) installed or in use by the State of Delaware, including data owned by the State but housed by third-party contractors. This guideline does not apply to computer systems where the Federal Government dictates what DBMS to be used.

III. Process

- A. **Adoption**: These guidelines have been adopted by the Department of Technology and Information (DTI) through the Technology and Architecture Standards Committee (TASC) and are applicable to all Information Technology use throughout the State of Delaware.
- B. **Revision**: Technology is constantly evolving; therefore the guidelines will need to be regularly reviewed. It is the intent of the TASC to review this guideline annually. The TASC is open to suggestions and comments from knowledgeable individuals within the state, although we ask that they be channeled through your Information Resource Manager (IRM).
- C. **Contractors**: Contractors or other third parties are required to comply with these guidelines when proposing technology solutions to DTI or other state entities. Failure to do so could result in rejection by the Delaware Technology Investment Council. For further guidance, or to seek review of a component that is not rated below, contact the TASC at dti_tasc@delaware.gov.
- D. **Implementation responsibility**: DTI and/or the organization's technical staff will implement these guidelines during the course of normal business activities, including business case review, architectural review, project execution and the design, development, or support of systems.
- E. **Enforcement**: DTI will enforce these guidelines during the course of normal business activities, including business case and architectural review of proposed projects and during the design, development, or support of systems. These guidelines may also be enforced by others during the course of their normal business activities, including audits and design reviews.
- F. **Contact us**: Any questions or comments should be directed to dti_tasc@delaware.gov.

IV. Definitions/Declarations

A. **Definitions**

1. **Database**: A collection of information organized in such a way that a computer program can quickly select desired pieces of data. Traditional databases are organized by field, record and file. A field is a single piece of information; a record is one complete set of fields; and a file is a collection of records. To access information from a database, a database management system (DBMS) is needed. This is a collection of programs that enables the user to enter, organize, and select data in a database.



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2. **Database Management System (DBMS):** A collection of programs that provides the capability to store, modify, and extract information from a database. There are many different types of DBMS's, ranging from small systems that run on personal computers to large systems that run on midrange or mainframes. The terms relational, flat, network and hierarchical all refer to the way a DBMS organizes information internally. The internal organization can affect how quickly information can be extracted. Requests for information from a database are made in the form of a query, which is a stylized question. The set of rules for constructing queries is known as a query language. Different DBMS's support different query languages, although there is a semi-standardized query language called SQL (structured query language). For the purposes of this document, database and database management system are used interchangeably.
3. **Scalable:** Scalable database is defined as the capability of the database to meet current/future requirements without major effects on the existing structures. A scalable database will easily grow in both size and infrastructure with little or no measurable impact on the performance of the operational database, system, or network
4. **Enterprise Database:** A database or group of databases supporting a Statewide or multi-agency function or system with a single administrative authority. A database or group of databases supporting operations deemed critical to the business of the State or agency.
5. **Desktop DBMS:** a type of DBMS which is designed for running small scale databases, generally located on personal computers.
6. **Mission Critical System:** A system that is critical to the functioning of an organization and the accomplishment of its mission. Therefore, if a mission critical system is lost or unavailable, the agency will be unable to perform some or all of its most basic functions. Also, a system is deemed mission critical if its loss would cause an unacceptable slowdown in the functioning of an agency.
7. **Personal Workstation:** Any computing device engineered to remain stationary that contains a hard drive, memory, and CPU (the monitor and keyboard are usually separate pieces from the PC case) and expansion slots. The intent of the device is to be used by one person at a time, or perhaps one person and a print service.
8. **Embedded:** An embedded system is some combination of computer hardware and software, either fixed in capability or programmable, that is specifically designed for a particular kind of application device. Industrial machines, automobiles, medical equipment, cameras, household appliances, airplanes, vending machines, and toys are among the possible hosts of an embedded system. Embedded systems that are programmable are provided with a programming interface, and embedded systems programming is a specialized occupation.
9. **System Administrator:** The human being responsible for running and maintaining a computer system at the Operating System (OS) level especially a mainframe, minicomputer, or local area network. System administrators, sometimes called network administrators, issue login names, maintain security, fix failures, and advise management about hardware and software purchases.



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10. Remote Access: It is a means by which users can gain authenticated access to internal network resources, preferably without posing a security risk to valuable assets within the network.
11. Programmable Access: It is a means of reading and updating data in a database management system through controlled machine instructions.
12. Database Administrator: [A database administrator \(DBA\) is a person responsible for the design, implementation, maintenance and repair of an organization's database.](#) A DBA maintains database logins, maintains database security, monitors performance and performs database software patches/upgrades.

B. Declarations

A DBMS should:

1. Be tunable for performance and space maximization.
2. Be scalable.
3. Work within the State's IT Infrastructure.
4. Provide the ability to minimize redundant data.
5. Be able to secure data structures.
6. Contain data integrity facilities;
 - Provide Point-in-time recovery
 - General backup/restore methodology
 - Ensure that what was intended to be written was, in fact written.
7. Be 'system administrator' friendly;
 - Contain tunable operational parameters
 - Provide tools for modifying data file/table design
 - Utility suite for support functionality.
8. Provide audit trail capabilities.
9. Provide for transaction rollback.
10. Have a search/update engine that will accompany the relational database or provide a "vehicle" to interface with existing 3gl/4gl integrated software.
11. Adhere to the Software Policy, Delaware Information Security Policy, and Systems Architecture Standard.



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V. Guidelines

A. Definition of Ratings

1. Component Ratings

COMPONENT RATING	USAGE NOTES
STANDARD – DTI offers internal support and/or has arranged for external vendor support as well (where applicable). DTI believes the component is robust and can be expected to enjoy a useful life of 3+ years from the Effective Date.	These components can be used without explicit DTI approval for both <u>new projects</u> and <u>enhancement</u> of existing systems.
DECLINING – Deprecated - DTI considers the component to be a likely candidate to have support discontinued in the near future. A deprecated element is one becoming invalid or obsolete.	Via the State's waiver process, these components should be explicitly approved by DTI for <u>all projects</u> . They should not be used for <u>minor enhancement</u> and <u>system maintenance</u> without explicit DTI approval via the State's waiver process.
DISALLOWED – DTI declares the component to be unacceptable for use and will actively intervene to disallow its use when discovered.	No waiver requests for new solutions with this component rating will be considered.

2. Missing Components – No conclusions should be inferred if a specific component is not listed. Instead, contact the TASC to obtain further information

3. Component Assessments

- i. All DBMS's should be licensed in a manner appropriate to the way they are used and up-to-date with all appropriate publisher service patches.
- ii. All multiple-user DBMS's should be placed on servers. No multiple-user DBMS will be hosted on a PC.
- iii. All multiple-user DBMS's should be under formal support and approved by the IRM.
- iv. To determine the supported versions for the various release levels, consult the vendor's web site.

4. Components

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Component	Rating	Comments
<u>Relational DB</u>		
Oracle Standard or Enterprise (See Appendix I)	Standard	General Release Levels
	Declining	Extended Support Release Levels
	Disallowed	Unsupported Release Levels
DB2 Mainframe	Standard	General Release Levels
	Declining	Extended Support Release Levels
	Disallowed	Unsupported Release Levels
SQL Server (See Appendix I)	Standard	General Release Levels
	Declining	Extended Support Release Levels
	Disallowed	Unsupported Release Levels
SQL Server Express	Standard	This version of SQL Server can be appropriate for a smaller database where the data size is less than 4GB and the end users are limited to a single organization.
	Declining	Extended Support Release Levels
	Disallowed	Unsupported Release Levels
Personal Workstation DBMSs (e.g., Microsoft Access, SQL Server Express LocalDB)	Standard	For use on a desktop by one user when the DR/BCP criticality classification is minimal (5) and the data classification is public
	Disallowed	For a system with a DR/BCP criticality classification of limited (4) or higher. Or for a system with a DR/BCP criticality classification of minimal (5) and the data classification is confidential, secret, or top secret.



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SYBASE	Declining	(General or Extended Support Release Levels)
DB2 Server	Declining	
<u>Open Source</u>		Please review the State Software Policy Software Policy for Open Source Implications
MySQL	Standard	Supported versions with current patches
PostgreSQL	Standard	General Release Levels
	Declining	9.6.23
	Disallowed	Less than or equal to 9.5.25
MongoDB (See Appendix I)	Standard	General Release Levels
	Declining	4.0
	Disallowed	Less than or equal to 3.6
<u>Non Relational</u>		
IMS	Disallowed	No New Development (General or Extended Support Release Levels)
Adabas	Standard	General Support Release Levels
	Declining	Extended Support Release Levels
Lotus Domino	Declining	Database server service only (Notes Storage Facility)
		Version 8.5 and above

5. Lifecycle Roadmap

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Lifecycle Roadmap

Databases										
DTI	Jun-21	Dec-21	Jun-22	Dec-22	Jun-23	Dec-23	Jun-24	Dec-24	Jun-25	Dec-25
Oracle 11.2.0.4	Decline	Decline	Decline	Decline	EOL					
Oracle 12.1.0.2	Decline	Decline	Decline	EOL						
Oracle 12.2.0.1	Decline	Decline	Decline	EOL						
Oracle 19c	GA	GA	GA	GA	GA	GA	GA	Decline	Decline	Decline
MSSQL 2012	Decline	Decline	Decline	EOL						
MSSQL 2014	Decline	Decline	Decline	Decline	Decline	Decline	Decline	EOL		
MSSQL 2016	GA	GA	Decline	Decline	Decline	Decline	Decline	Decline	Decline	Decline
MSSQL 2017	GA	GA	GA	GA	Decline	Decline	Decline	Decline	Decline	Decline
MSSQL 2019	GA	GA	GA	GA	GA	GA	GA	GA	Decline	Decline
Mongo DB 4.0	GA	GA	GA	EOL						
Mongo DB 4.2	GA	GA	TBD							
Vendor	Jun-21	Dec-21	Jun-22	Dec-22	Jun-23	Dec-23	Jun-24	Dec-24	Jun-25	Dec-25
Oracle 11.2.0.4	MDS	MDS	MDS	MDS	EOL					
Oracle 12.1.0.2	Paid ES	Paid ES	Paid ES	EOL						
Oracle 12.2.0.1	LEC	LEC	LEC	EOL						
Oracle 19c	PS/MS	PS/MS	PS/MS	PS/MS	PS/MS	PS/MS	PS/MS	Paid ES	Paid ES	Paid ES
MSSQL 2012	ES	ES	ES	EOL						
MSSQL 2014	ES	ES	ES	ES	ES	ES	ES	EOL		
MSSQL 2016	PS/MS	PS/MS	ES	ES	ES	ES	ES	ES	ES	ES
MSSQL 2017	PS/MS	PS/MS	PS/MS	PS/MS	ES	ES	ES	ES	ES	ES
MSSQL 2019	PS/MS	PS/MS	PS/MS	PS/MS	PS/MS	PS/MS	PS/MS	PS/MS	ES	ES
Mongo DB 4.0	PS/MS	PS/MS	PS/MS	EOL						
Mongo DB 4.2	PS/MS	PS/MS	TBD							

GA General Availability - Enterprise-wide standard with full deployment and support.

Decline Direction is to reduce use and dependence on over time. No new development. Support Only.

EOL Retiring from DTI enterprise. No implementation, development or support.

PS/MS Premier/Mainstream Support - Five years from General Availability date

ES Waived Extended Support

Paid ES Paid Extended Support

MDS Market Driven Support

LEC Limited Error Correction

References for Vendor Support Type details:

Oracle: [Oracle Software Technical Support Policies Guide](#)

MSSQLSVR: [Search Product and Services Lifecycle Information - Microsoft Lifecycle | Microsoft Docs](#)

MONGO DB: [MongoDB Software Lifecycle Schedules | MongoDB](#)

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VI. Development and Revision History

Date	Revision
1/13/2023	Rev 0 – Initial version based on a prior standard